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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/604,503	07/25/2003	Kenneth J Bures	OPN-006	1502
23701	7590	06/17/2004	EXAMINER	
RAUSCHENBACH PATENT LAW GROUP, LLC			VERBITSKY, GAIL KAPLAN	
P.O. BOX 387			ART UNIT	PAPER NUMBER
BEDFORD, MA 01730			2859	

DATE MAILED: 06/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/604,503	Applicant(s) BURES ET AL.	
	Examiner Gail Verbitsky	Art Unit 2859	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>11/25/2003</u> . | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Claim Objections

1. Claim 5 is objected to because of the following informalities: Perhaps applicant should replace "filer" in line 2 with –filter--. Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-3, 7 are rejected under 35 U.S.C. 102(b) as being anticipated by JP2000047117, Ulrich et al. [hereinafter JP].

JP discloses a device and a method of tuning/ maintaining a laser scanning type microscope (acousto-optic device) equipped with an AOTF (substrate/ acoustic wave transducer), the device set for maintaining stability of the AOTF substrate/ transducer performance by providing a temperature sensor (plurality temperature sensors) fitted directly to the AOTF and detecting its ambient temperature, the temperature is then transmitted to a central control unit 34 which has an arithmetic function to generate an adjusting/ control signal to adjust the AOTF-to-frequency relation of temperature dependency by a stored correction curve. A frequency shift caused by temperature variations is compensated. An AOTF driver (transducer) controls/ changing the frequency by varying the frequency. This would imply that the frequency is varied to

maintain proper phase-matching criteria. It is inherent that the control signal is a function of temperature measured by the temperature sensor. Temperature is also frequency dependent. Since it is known that wavelength is a function of frequency, it is, inherently, considered, that the temperature is also a function of (corresponds to) wavelength.

The method steps will be met during the normal operation of the device stated above.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 10-13, 16, 18, 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP in view of Kemeny et al. (U.S. 5039855) [hereinafter Kemeny].

JP discloses a laser scanning type microscope (acousto-optic device) equipped with an AOTF (substrate/ acoustic wave transducer), the device set for maintaining stability of the AOTF substrate/ transducer performance by providing a temperature sensor (plurality temperature sensors) fitted directly to the AOTF and detecting its ambient temperature, the temperature is then transmitted to a central control unit 34 which has an arithmetic function to generate an adjusting/ control signal to adjust the AOTF-to-frequency relation of temperature dependency by a stored correction curve. A frequency shift caused by temperature variations is compensated. An AOTF driver

Art Unit: 2859

(transducer) controls/ changing the frequency by varying the frequency. This would imply that the frequency is varied to maintain proper phase-matching criteria. It is inherent that the control signal is a function of temperature measured by the temperature sensor. Temperature is also frequency dependent. Since it is known that wavelength is a function of frequency, it is, inherently, considered, that the temperature is also a function of (corresponds to) wavelength.

JP does not explicitly state that the device comprises a processor and an oscillator, as stated in claim 10, and the remaining limitations of claims 10-13, 16, 18 and 21.

Kemeny discloses in Figs. 6-8, 11-12 to a an acousto-optic system 102 or AOTF module 158 which contains the AOTF 114 and transducers 122, the module lies on a support block/ substrate 160 comprising an AOTF, the device to control an AOTF comprising and AOTF 102, a temperature sensor 167, 170 located in the vicinity / proximity of the AOTF, wherein, the temperature sensor 170 lies inside/ embedded in the AOTF module for communicating the temperature of the AOTF to the controller/ microprocessor 300, 302. Kemeny suggests to drive the AOTF to any desired frequency, which changes (tune) the direction of wavelength. The tuned wavelength can be used to analyze a sample (substrate) of interest (col. 2, lines 20-31). The temperature sensor is connected to an electronic control for regulating temperature. To drive the AOTF 114 at a particular frequency to tune a particular wavelength band, the microprocessor 302 generates a signal for a circuit 326 part of which an VCO/ oscillator 328, the circuit 326 (oscillator 328) is coupled to a circuit of an amplifier 124 who is

connected to an acoustic wave transducer 122 (Fig. 7) to drive the AOTF 114 in response to a frequency of oscillator change in response to a control signal in order to maintain a desired phase-loop/ desired frequency (phase-match criteria).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device disclosed by JP, so as to have a processing circuit comprising a microprocessor, a VCO, as taught by Kemeny, in order to obtain a fine control and speed of controlling of AOTF, by using conventional frequency controlling devices.

JP does not explicitly teach the limitations of claim 13.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to embed the temperature sensor, disclosed by JP, in a module/ substrate, as taught by Kemeny, so as to obtain more accurate temperature measuring by providing a better thermal conduction from the object of interest (AOTF) to the temperature sensor.

6. Claims 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP in view of prior art stated by Fukukita et al. (U.S. 4936308) in col. 2, lines 30-47 [hereinafter Fukukita].

JP discloses the device/ method as stated above in paragraph 3.

JP does not explicitly teach measuring a delay time, as stated in claim 5, and that temperature is measured indirectly, as stated in claim 4.

Fukukita discloses a device comprising an indirect temperature measuring by transmitting pump pulses (first transducer) and probe pulses (second transducer) onto an object of interest, obtaining the variations in delay time between the pump and the probe, corresponding to respective phase states/ frequencies, and, using this data for indirect measuring/ determination of temperature.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method disclosed by JP, so as to obtain temperature indirectly by using a probe and a pump, as taught by Fukukita, because both of this methods are alternate types of method used to obtain temperature of the device of interest, which will perform the same function of obtaining the temperature of the AOTF, if one is replaced with the other.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method disclosed by JP, so as to obtain temperature indirectly by using a probe and a pump and a time delay between them as known in the art, as taught by Fukukita, because both of this methods are alternate types of method used to obtain temperature of the device of interest, which will perform the same function of obtaining the temperature of the AOTF, if one is replaced with the other, and allow the user to obtain more accurate results by allowing time delay between pumping light and measuring temperature, so as to allow the time for the light to propagate before being detected, as well known in the art.

The method steps will be met during the normal operation of the device stated above.

7. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP in view of Ball et al. (U.S. 5513913) [hereinafter Ball].

JP discloses the device as stated above in paragraph 3.

JP does not explicitly teach the limitations of claim 8.

Ball teaches that a birefringence of an optical waveguide is temperature dependent. This would imply, that, by measuring temperature, the birefringence data (change) can be obtained, and any adjustments (i.e., phase-matching) made due to a temperature change, will inherently reflect / correspond to any temperature dependent variable including birefringence of the waveguide.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method disclosed by JP, so as to tune the frequency dependent on temperature dependent birefringence, as taught by Ball, in order to allow the operator not only to control the temperature, but also to assess the refraction of the waveguide and its temperature dependent behavior, so as to achieve higher accuracy of the device/ method.

The method steps will be met during the normal operation of the device stated above.

8. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP and Kemeny as applied to claims 10-13, 16, 18, 21 above, and further in view of Ball.

JP and Kemeny disclose the device as stated above in paragraph 5.

They do not explicitly teach the limitations of claim 19.

Ball teaches that a birefringence of an optical waveguide is temperature dependent. This would imply, that, by measuring temperature, the birefringence data (change) can be obtained, and any adjustments (i.e., phase-matching) made due to a temperature change, will inherently reflect / correspond to any temperature dependent variable including birefringence of the waveguide.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device, disclosed by JP and Kemeny, so as to tune the frequency dependent on temperature dependent birefringence, as taught by Ball, in order to allow the operator not only to control the temperature, but also to assess the refraction of the waveguide and its temperature dependent behavior, so as to achieve higher accuracy of the device/ method.

9. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP and Kemeny as applied to claims 10-13, 16, 18, 21 above, and further in view of Kleppe (U.S. 5349859).

JP and Kemeny disclose the device as stated above in paragraph 5.

They do not explicitly teach the limitations of claim 19.

Kleppe states that the relationship between the temperature and an acoustic velocity (speed of sound) are known. This would imply, that, by knowing the temperature, the acoustic velocity in a waveguide can be found, and any adjustments (i.e., phase-matching) made due to a temperature change, will inherently reflect /

Art Unit: 2859

correspond to any temperature dependent variable including an acoustic velocity in the waveguide.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device, disclosed by JP and Kemeny, so as to tune the frequency dependent on temperature dependent acoustic velocity/ speed, as taught by Kleppe, in order to allow the operator not only to control the temperature, but also to assess the waveguide and its temperature dependent behavior, so as to achieve higher accuracy of the device/ method.

10. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP in view of Kleppe (U.S. 5349859).

JP discloses the device as stated above in paragraph 3.

JP does not explicitly teach the limitations of claim 9.

Kleppe states that the relationship between the temperature and an acoustic velocity (speed of sound) are known. This would imply, that, by knowing the temperature, the acoustic velocity in a waveguide can be found, and any adjustments (i.e., phase-matching) made due to a temperature change, will inherently reflect / correspond to any temperature dependent variable including an acoustic velocity in the waveguide.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method, disclosed by JP, so as to tune the frequency dependent on temperature dependent acoustic velocity/ speed, as taught by

Art Unit: 2859

Kleppe, in order to allow the operator not only to control the temperature, but also to assess the waveguide and its temperature dependent behavior, so as to achieve higher accuracy of the device/ method.

The method steps will be met during the normal operation of the device stated above.

11. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP in view of Aderhold et al. (U.S. 6164816) [hereinafter Aderhold].

JP discloses the device and method as stated above in paragraph 3.

JP does not teach measuring temperature at a plurality location and detecting an average temperature.

Adelhold teaches measuring temperature at a plurality location and detecting an average temperature so as to tune a substrate whose temperature is to be measured.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method, disclosed by JP, so as to obtain an average temperature of the AOTF module/ substrate, as taught by Adelhold, so as to respond only to an average temperature when tuning the frequency, and thus, eliminate influence of a malfunctioned temperature sensor on the method of temperature dependent tuning.

The method steps will be met during the normal operation of the device stated above.

12. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP and Kemeny, as applied to claims 10-13, 16, 18, 21 above, and further in view of Adelhold.

Art Unit: 2859

JP and Kemeny disclose the device and method as stated above in paragraph 5.

They do not teach measuring temperature at a plurality location and detecting an average temperature.

Adelhold teaches measuring temperature at a plurality location and detecting an average temperature so as to tune a substrate whose temperature is to be measured.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method, disclosed by JP and Kemeny, so as to obtain an average temperature of the AOTF module/ substrate, as taught by Adelhold, so as to respond only to an average temperature when tuning the frequency, and thus, eliminate influence of a malfunctioned temperature sensor on the method of temperature dependent tuning.

13. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP and Kemeny, as applied to claims 10-13, 16, 18, 21 above, in view of Frerking (U.S. 6545550).

JP and Kemeny disclose the device as stated above in paragraph 5.

They do not teach that the temperature sensor is a thermistor.

Frerking teaches a temperature sensor being a thermistor.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the temperature sensor, disclosed by JP and Kemeny, with a thermistor, as taught by Frerking because both of them are alternate

Art Unit: 2859

types of temperature sensing devices, which will perform the same function, of sensing the temperature of the device of interest/ AOTF, if one is replaced with the other.

14. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP and Kemeny, as applied to claims 10-13, 16, 18, 21, above in view of Bortolini et al. (U.S. 5473640) [hereinafter Bortolini].

JP discloses the device as stated above in paragraph 3.

JP does not teach that the oscillator is a digital frequency synthesizer, as stated in claim 17.

Bortolini teaches in Fig. 1 that in a conventional phase-lock (phase-match) loop, oscillator 14 can comprise a voltage controlled crystal oscillator or a digital frequency synthesizer.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the frequency synthesizer, disclosed by JP and Kemeny, with a digital frequency synthesizer, as taught by Bortolini, because both of them are alternate types of frequency synthesizers, which will perform the same function, of driving the AOTF, if one is replaced with the other.

15. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

Art Unit: 2859

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Conclusion

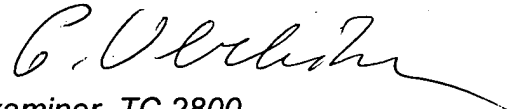
The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art cited in the PTO-892 and not mentioned above disclose related devices and methods.

Any inquiry concerning this communication should be directed to the Examiner Verbitsky who can be reached at (571) 272-2253 Monday through Friday 8:00 to 4:00 ET.

GKV

Gail Verbitsky

Primary Patent Examiner, TC 2800



June 07, 2004